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# IS 2081 (1998): Automotive Vehicles - Taper Terminal Cable Connectors for Batteries - brass type connectors [TED 11: Automotive Electrical Equipment]

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*( दूसरा पुनरीक्षण )*

*Indian Standard*

# AUTOMOTIVE VEHICLES — TAPER TERMINAL CABLE CONNECTORS FOR BATTERIES — SPECIFICATION

*( Second Revision )*

ICS 29.220.99; 43.040

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**BUREAU OF INDIAN STANDARDS**
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*October* 1998

**Price Group 3**

Automotive Electrical Equipment Sectional Committee, TED 11

## FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1962. First revision of this standard was undertaken in 1976. The first revision of the standard was based on DIN 72332:1968 'Cable connectors for starter batteries; soldering terminals' published by DIN, Germany. The present revision incorporates the three amendments issued since then and also includes lead alloy type battery terminal connectors.

This second revision covers the terminal connectors for batteries covered by IS 7372:1974 'Lead acid storage batteries for motor vehicles' for connection to copper conductors or aluminium conductors with suitable arrangement.

In the preparation of this standard considerable assistance has been taken from the following:

JIS D 5403-1977 Cable terminals for automobiles

The committee responsible for the preparation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

# AUTOMOTIVE VEHICLES — TAPER TERMINAL CABLE CONNECTORS FOR BATTERIES — SPECIFICATION

*( Second Revision )*

## 1 SCOPE

This standard covers the dimensions, material and methods of tests for brass and lead alloy type terminal connectors used in conjunction with lead-acid storage batteries for motor vehicles for connection to copper conductors or aluminum conductors with suitable arrangement.

## 2 REFERENCES

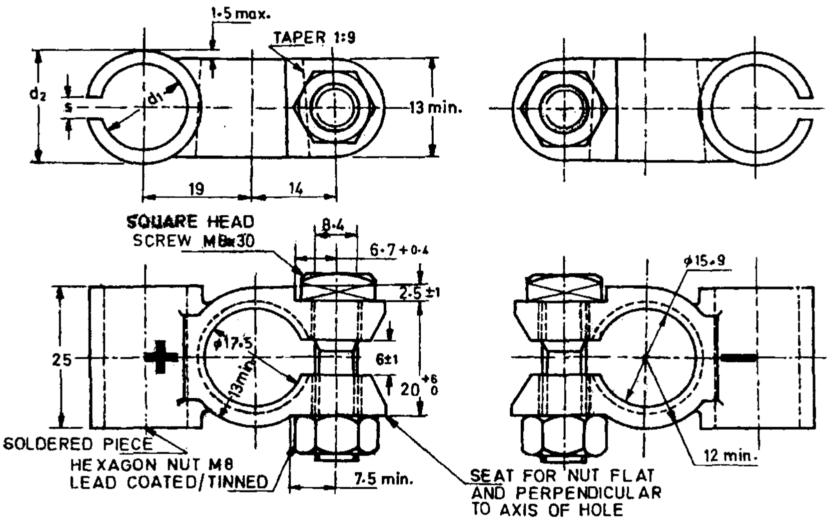
The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| *IS No.* | *Title* |
|---|---|
| 292:1983 | Leaded brass ingots and castings (*second revision*) |
| 1359 : 1992 | Electroplated coatings of tin (*third revision*) |
| 1363 (Part 3) : 1992 | Hexagonal headed bolts, screws and nuts of product grade C : Part 3 Hexagon nuts (size range M5 to M36) (*third revision*) |
| 1367 (Part 2) : 1979 | Technical supply conditions for threaded steel fasteners: Part 2 Product grades and tolerances (*second revision*) |
| 1654 : 1992 | Lead antimony alloys (*third revision*) |
| 1992 : 1979 | Electroplated coatings of lead (*first revision*) |
| 2585 : 1968 | Black square bolts and nuts (dia range 6 to 39 mm) and black square screws (dia 6 to 24 mm) (*first revision*) |
| 9000 (Part 7/Sec 5) : 1979 | Basic environmental testing procedures for electronic and electrical items: Part 7 Impact test, Section 5 Free fall, repeated |

## 3 DIMENSIONS

**3.1** The recommended dimensions of brass type terminal connectors for automobile batteries are given in Fig. 1 and Table 1.

NOTE — The shape of taper terminal shown in the figure is only typical. Taper terminal cable connectors of shapes other than that shown in the figure shall also be considered as standard, provided they comply with the dimensions indicated.



FOR PLUS POLE
FORM A

FOR MINUS POLE
FORM B

NOTE — The dimensions which are not shown for MINUS POLE shall be same as the dimensions given for PLUS $d_1$ = nominal diameter of the cable connector. $d_2$ = overall diameter of the cable connector.

All dimensions in millimetres.

FIG. 1 BATTERY TERMINAL CONNECTOR

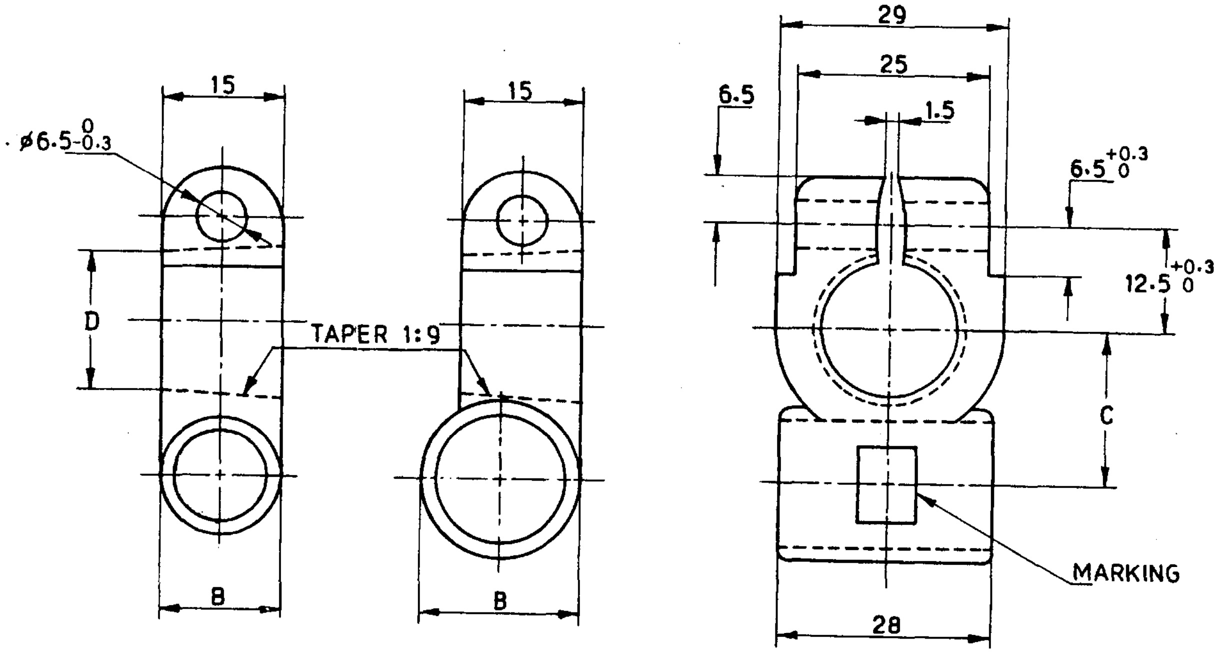
**Table 1 Dimensions of Terminal Connectors (Brass Type)**
(*Clause* 3.1)

| Nominal Cross-Sectional Area of the Cable (mm²) | Cable Connector Diameter (mm) | | Opening Width 's' (mm) |
|---|---|---|---|
| | '$d_1$' | '$d_2$' | |
| 16<br>25<br>35 | 8.5<br>8.5<br>9.7 | 15.0<br>15.0<br>15.0 | 3 ± 1 |
| 50<br>70 | 11.6<br>13.5 | 20.0<br>20.0 | 4 ± 1 |
| 95<br>120 | 15.5<br>17.5 | 24.0<br>24.0 | 5 ± 1 |

**3.1.1** Unless otherwise specified, a tolerance of ± 0.4 mm shall be allowed.

**3.2** Square bolt M8 × 30 of IS 2585 and hexagonal nut M8 according to IS 1363 (Part 3) shall be selected for use with the connectors.

**3.3** The dimensions of lead alloy type terminal connectors for automobile batteries shall conform to those specified in Fig. 2 and Table 2.



All dimensions in millimetres.

FIG. 2 BATTERY TERMINAL CONNECTOR — LEAD ALLOY TYPE

**Table 2 Dimensions of Terminal Connector (Lead Alloy Type)**
(*Clause* 3.3)

| Nominal Cross-Sectional Area of the Cable (mm²) | *D* (mm) | *B* (mm) | *C* (mm) | *Marking* |
|---|---|---|---|---|
| 8-40 | 17.5 ± 0.3 | 15 | 15 | + |
| 8-40 | 16.0 ± 0.3 | 15 | 15 | – |
| 50-100 | 17.5 ± 0.3 | 20 | 20 | + |
| 50-100 | 16.0 ± 0.3 | 20 | 20 | – |

**3.3.1** Unless otherwise specified, a tolerance of ±0.3 mm shall be allowed.

### 3.4 Bolt and Nut for Lead Alloy Connectors

The dimension of bolt M6 should be as shown in Fig. 3. Hexagonal nut M6 according to IS 1363 (Part 3) shall be selected for use with the connector.

## 4 MATERIAL AND CONSTRUCTION

### 4.1 Terminal Connector (Brass Type)

The terminal connectors shall be made of brass and shall conform to Grade 3 of IS 292. The terminal connector shall be either forged for cast and then forged. The terminal shall be such that it is suitable for soldering the cable.

**4.1.1** The terminal connector shall be free from flaws and the taper shall be true.

**4.1.2** The terminal connector shall be coated with lead. The lead coating shall comply with the requirements of Grade '4' with a minimum thickness of 0.075 mm as specified in IS 1992.

### 4.2 Terminal Connector (Lead Alloy Type)

Lead alloy type terminal connectors shall be made of lead antimony alloy and shall conform to grade Pbsb 8 of IS 1654. The terminal shall be such that it is moulded on to the cable.

### 4.3 Bolts and Nuts

The bolts and nuts shall comply with the requirements of IS 1367 (Part 2) specified for black grade with regard to manufacture, workmanship and tolerances.

**4.3.1** The bolts and nuts shall be either coated with lead or tin.

**4.3.1.1** In the case of lead coating, it shall comply with requirements of Grade '4' with a minimum thickness of 0.075 mm as specified in IS 1992.

**4.3.1.2** In the case of tin coating, it shall comply with the requirements of Class Sn 25 S of IS 1359.

## 5 TESTS

The following tests shall be carried out on taper terminals:

a) Visual examination (*see* **5.1**),

b) Test for soundness (*see* **5.2**), and

c) Coating suitability test (*see* **5.3**) (applicable for coated terminals only).

### 5.1 Visual Examination

The visual examination shall be carried out for workmanship and finish. The terminal connector shall be free from injurious flaws and cracks.

### 5.2 Test for Soundness

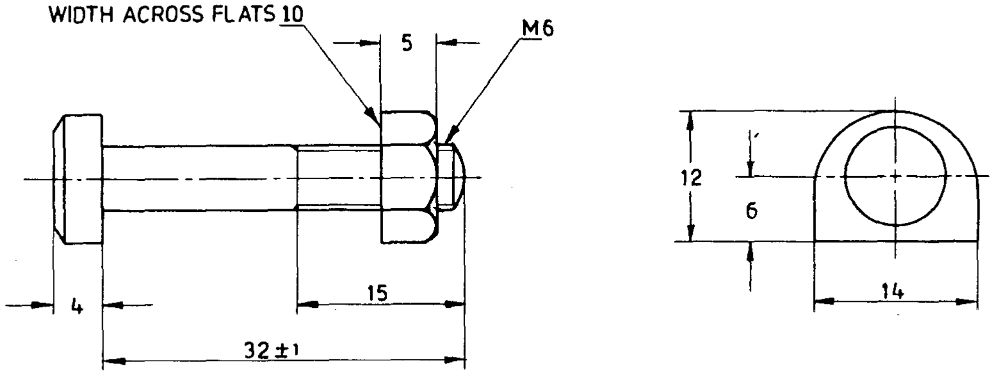
The following test shall be carried out to check soundness of the terminal:

a) Support the terminal on a steel piece having same dimensions of the battery terminal and tighten the nut by applying a force of 29 kg at the end of a open-ended spanner. There shall not be any damage.

b) Free fall test shall be carried out as per IS 9000 (Part 7 / Sec 5) with number of falls 100. There shall be no breakage or excessive damage after the test.

### 5.3 Coating Suitability Test (applicable for coated terminals only)

This test is intended to check suitability of coatings. The terminal shall be tested for 10 cycles consisting of immersion in battery grade sulphuric acid of specific gravity 1.25 for 5 minutes and drying in free air for 15 minutes. After the test the coating shall not expose the base material.



All dimensions in millimetres.

FIG. 3 BOLT AND NUT FOR CONNECTORS

## 6 MARKING AND PACKING

**6.1** Each terminal connector shall be embossed with the marking '+' or '–' as indicated in Fig. 1 for positive and negative connectors, respectively.

**6.2** The packing containing the terminal connectors shall be marked with the following:

a) The name and/or trade-mark of the manufacturer or the supplier, and

b) Type designation.

## 7 BIS CERTIFICATION MARKING

The product may also be marked with the Standard Mark.

**7.1** The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

# ANNEX A

*(Foreword)*

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(*Continued on page* 6)

*(Continued from page 5)*

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